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| 10/541,261 | 09/26/2005 | Sang Yup Lee | 4240-123 | 6596 |

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| EXAMINER | |
|---|---|
| JUNG, UNSU | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/541,261 | LEE ET AL. | |
| | Examiner | Art Unit | |
| | UNSU JUNG | 1641 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *19 August 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) *8 and 10* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *7/1/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Election/Restrictions*

1. As a preliminary matter, election of species within List II, the election of species within List II has been withdrawn upon further consideration.

2. Applicant's election with traverse of species A (leptin, claim 2) from List I and species B (antibody/fluorescent labeled antibody claims 7 and 9) from List III in the reply filed on May 14, 2008 is acknowledged. The traversal is on the ground(s) that both linker protein and substrate peptide are encompassed by claim 1 and relate to one another. This is not found persuasive because each of the linker species in List I and reactive protein species from List III do not share common special technical feature as each species of linker molecules and reactive proteins are structurally and functional distinct molecules. Therefore, the linker species in List I and reactive protein species from List III do not relate to a single inventive concept.

The requirement is still deemed proper and is therefore made FINAL.

### *Status of Claims*

3. Claims 1-10 are pending, claims 8 and 10 have been withdrawn from consideration, and claims 1-7 and 9 are currently under consideration for patentability under 37 CFR 1.104.

***Priority***

4. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). This application is the U.S. national stage application of International PCT Application No. PCT/KR2003/002183, filed on October 18, 2003, which claims the priority of Korean Patent Application Serial No. 10/2003/0000464, filed on January 4, 2003. The certified copy of Korean Patent Application Serial No. 10/2003/0000464 has been filed in the instant application.

***Information Disclosure Statement***

5. The information disclosure statement filed on July 1, 2005 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the reference that has been lined through therein (Cite No. AV, Bradford) has not been considered.

***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-7 and 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 and all dependent claims thereof are vague and indefinite as claim 1 lacks a transitional phrase, which define the scope of a claim with respect to what unrecited additional components or steps, if any, are excluded from the scope of the claim. See MPEP 2111.03. Therefore, claim 1 fails to define the metes and bounds of the claimed protein chip as it is unclear which components are included and which unrecited additional components or steps, if any, are excluded from the scope of the claim. For the purpose of examination, claim 1 has been given its broadest reasonable interpretation in light of the supporting disclosure. See MPEP 2106. According to the specification (p4), the protein chip includes a substrate peptide with a linker protein immobilized on a solid substrate by the mediation of linker protein. Therefore, claim 1 has been interpreted as being "A protein chip of a S-L-SP form comprising a solid substrate (S) and a substrate peptide (SP) immobilized on the solid substrate by a linker protein (L) for the purpose of examination.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1, 6, 7, and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Duffy (U.S. PG Pub. No. US 2002/0028463 A1, Mar. 7, 2002).

Duffy anticipates instant claims by teaching a protein chip of a S-L-SP form (see entire document, particularly Fig. 4), wherein a substrate peptide (SP, p5, paragraph [0046]) is immobilized on a solid substrate (S, array) by the mediation of a linker protein (L, streptavidin, p10, paragraph [0091] and Fig. 4).

With respect to claim 6, Duffy teaches a method for analyzing interaction between a reactive protein and the substrate peptide comprising the steps of:

- adding a reactive protein to the protein chip, the reactive protein showing a specific interaction with the substrate peptide immobilized on the protein chip (p4, paragraphs [0034]-[0038]); and
- detecting the interaction between the reactive protein and the substrate peptide (p4, paragraphs [0034]-[0038]).

With respect to claims 7 and 9, Duffy teaches a method, wherein the reactive protein is an antibody labeled with fluorescent tags (pp4-5, paragraph [0038]).

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over MacBeath et al. (*Science*, Sept. 8, 2000, Vol. 289, pp1760-1763) (hereinafter "MacBeath") in view of Inglese et al. (U.S. Patent No. 6,335,176 B1, Jan. 1, 2002) (hereinafter "Inglese").

With respect to claims 1 and 5, MacBeath teaches protein microarrays (protein chips) for high throughput function determination (see entire document). A variety of chemically derivatized slides (solid substrate) can be printed for example slides treated with aldehyde-containing silane reagent. The aldehydes can react readily with primary amines on the proteins. Protein microarray offer an ideal system, for example, for the rapid and parallel identification of substrates of protein kinases using protein microarray spotted with protein substrates such as kemptide (substrate peptide, p1762, 1st column, 2nd paragraph).

With respect to claim 6, MacBeath teaches a method for analyzing interaction between a reactive protein and the substrate peptide comprising the steps of:

- adding a reactive protein to the protein chip, the reactive protein showing a specific interaction with the substrate peptide immobilized on the protein chip (p1762, 2nd paragraph); and
- detecting the interaction between the reactive protein and the substrate peptide (p1762, 2nd paragraph).

However, MacBeath is silent on teaching that the substrate peptide is immobilized on the solid substrate by the mediation of a linker protein.

Inglese teaches reagents for incorporating phosphorylation sites into compounds, particularly into proteins (linker protein) and peptides (see entire document, particularly column 2, lines 11-26). The reagents include a peptide sequence that contains kinase substrate (column 2, lines 11-19) including "kemptide" sequence, LRRASLG (column 7,

line 67). The resulting compound is useful for many types of assays including high throughput screening assays (column 10, lines 6-11).

With respect to claim 2, Inglese teaches the linker protein comprises leptin (column 13, lines 26-51).

With respect to claims 3 and 4, Inglese teaches the substrate peptide comprises kemptide (SEQ ID NO: 1).

Therefore, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to employ the reagents of Inglese, which includes proteins linked to substrate peptides, in the protein microarray of MacBeath in order to immobilize small substrate peptides. The advantage of allowing small substrate peptides linked to protein molecules to be attached to the protein microarray surface without being obscured by BSA molecules, which are used to reduced nonspecific binding of other proteins by quenching unreacted aldehydes on the protein microarray surface as taught by MacBeath (p1760, 5$^{th}$ paragraph-p1760, 1$^{st}$ paragraph), provides the motivation to combine teachings of MacBeath and Inglese with a reasonable expectation of success.

***Prior Art of Record***

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Wagner et al. (U.S. Patent No. 6,475,809 B1, Nov. 5, 2002) teaches a protein array, which includes polypeptides immobilized on a substrate surface via linker molecules (see entire document).
- Labaer et al. (U.S. PG Pub. No. US 2002/0192673 A1, Dec. 19, 2002) teaches arrays of polypeptides immobilized on a solid substrate via linker amino acids (see entire document, particularly paragraph [0007]).
- Yokota (U.S. PG Pub. No. US 2002/0086311 A1, July 4, 2002) teaches that when binding a ligand to an extracellular region, the receptor protein kinase undergoes a conformational change to form a dimer, resulting in increased kinase domain activity in the intracellular region, whereby self-phosphorylation or phosphorylation of a substrate of the above kinase takes place (see entire document, particularly p6, paragraph [0090]).
- Bergdoll et al. (*Structure*, 1997, Vol. 5, pp391-401) teaches that oligomerization is an important step in the activation or regulation of many proteins (p399, *Biological implications*, 1st paragraph). Prolines seems to be involved in switching between monomeric and oligomeric forms (p399, *Biological implications*, 2nd paragraph). The ability of prolines to trigger arm exchange has practical application (p399, *Biological implications*, 3rd paragraph). New synthetic oligomers could be created by forcing arm exchange and the ratio of oligomers to monomers could be modified (pp399-400, *Biological implications*, 3rd paragraph). The mode of action of which is thought to be linked to conformational modification and to

variation of the oligomeric state could be studied using the synthetic oligomers (p400, *Biological implications*, 3rd paragraph).

***Conclusion***

15. No claim is allowed.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to UNSU JUNG whose telephone number is (571)272-8506. The examiner can normally be reached on M-F: 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on 571-272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Unsu Jung/
Unsu Jung
Primary Examiner
Art Unit 1641